

AMENDMENTS TO THE CLAIMS

Please amend claim 1, such that the status of the claims is as follows:

1. (Currently amended) A magnetic sensor comprising:
a sensor stack; and
means for providing an electric field that creates a charge carrier depleted region in the sensor stack to produce an electrical dimension of the sensor stack which is smaller than a corresponding physical dimension of the sensor stack.
2. (Original) The magnetic sensor of claim 1, wherein the electrical dimension is electrical read width.
3. (Original) The magnetic sensor of claim 2, wherein the means for providing an electric field comprises two bias electrodes disposed on opposing sides of the sensor stack such that an electrical width of the sensor stack is a function of a bias voltage applied to the two bias electrodes.
4. (Original) The magnetic sensor of claim 3, wherein the two bias electrodes are biased with negative DC bias voltages.
5. (Original) The magnetic sensor of claim 3, wherein the two bias electrodes are biased with positive DC bias voltages.
6. (Original) The magnetic sensor of claim 3, wherein the two bias electrodes are biased with an AC bias voltage.
7. (Original) The magnetic sensor of claim 3, wherein the two bias electrodes are biased with bias voltages of opposite polarity.

8. (Original) The magnetic sensor of claim 2, wherein the means for providing an electric field comprises a bias electrode disposed on a side of the sensor stack such that an electrical width of the sensor stack is a function of a voltage of the bias electrode.

9. (Original) The magnetic sensor of claim 1, wherein the electrical dimension is electrical stripe height.

10. (Original) The magnetic sensor of claim 9, wherein the means for providing an electric field comprises a bias electrode disposed on a side of the sensor stack opposite an air bearing surface of the sensor stack such that an electrical stripe height of the sensor stack is a function of a bias voltage applied to the bias electrode.

11. (Original) A magnetoresistive read head comprising:
a magnetoresistive stack; and
a first bias electrode positioned with respect to the magnetoresistive stack such that an electrical width of the magnetoresistive stack is a function of a bias voltage applied to the first bias electrode.

12. (Original) The magnetoresistive read head of claim 11, wherein the first bias electrode is disposed on a side of the magnetoresistive stack.

13. (Original) The magnetoresistive read head of claim 12, further comprising:
a second bias electrode disposed on a side of the magnetoresistive stack opposite the first bias electrode, the first and second bias electrodes each providing a voltage.

14. (Original) The magnetoresistive read head of claim 13, further comprising
a third bias electrode disposed on a side of the magnetoresistive stack opposite an air
bearing surface of the magnetoresistive stack such that an electrical stripe height
of the magnetoresistive stack is a function of a bias voltage applied to the third
biased electrode.
15. (Original) The magnetoresistive read head of claim 12, further comprising:
a second bias electrode disposed on a side of the magnetoresistive stack opposite the first
bias electrode, the second bias electrode having a bias voltage of opposite polarity
to a bias voltage applied to the first bias electrode.
16. (Previously presented) The magnetoresistive read head of claim 11, wherein the first bias electrode
is made of a material selected from the group consisting of Rh, Ti, CoPt, CoCrPt, Cr, NiPd, NiCu, Au,
Pt, Pd, V, Ta, and alloys thereof.
17. (Withdrawn) The magnetoresistive read head of claim 11, wherein the magnetoresistive stack
is a tunneling magnetoresistive stack including two sensing layers with a tunnel barrier positioned
therebetween.
18. (Withdrawn) The magnetoresistive read head of claim 17, wherein the tunnel barrier is made of
a semiconductive material selected from the group consisting of GaP, AlP, ZnSe, AlAs, CdS, CdSe, AlSb,
ZnTe, CdTe, and alloys thereof.
19. (Withdrawn) The magnetoresistive read head of claim 17, wherein the tunnel barrier is a
dielectric barrier made of an oxide compound having a negative heat of formation.

20. (Withdrawn) The magnetoresistive read head of claim 17, further comprising:
one or more semiconductive current channeling layers positioned within the
magnetoresistive stack
21. (Withdrawn) The magnetoresistive read head of claim 20, wherein the one or more
semiconductive current channeling layers are made of a semiconductive material selected from the group
consisting of GaP, AlP, ZnSe, AlAs, CdS, CdSe, AlSb, ZnTe, CdTe, and alloys thereof.
22. (Withdrawn) The magnetoresistive read head of claim 17, wherein the sensing layers are made
of a magnetic semiconductive material.
23. (Withdrawn) The magnetoresistive read head of claim 17, wherein the sensing layers are made
of a half-metallic ferromagnetic material selected from the group consisting of CrO_2 , CoTiO , ZnCoO , a
Heusler alloy, Fe_3O_4 , a Mn oxide compound with a perovskite structure, and a Mn nitride compound.
24. (Withdrawn) The magnetoresistive read head of claim 11, wherein the magnetoresistive stack
is a giant magnetoresistive stack including two sensing layers with a conducting spacer positioned
therebetween.
- 25-26. (Canceled)